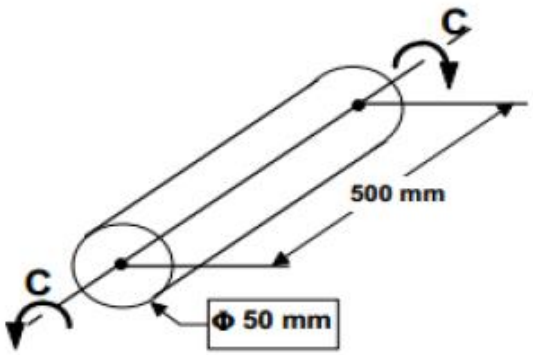
2nd year
Mechanics of Materials (RDM)

T.D N° 8 (Torsion)

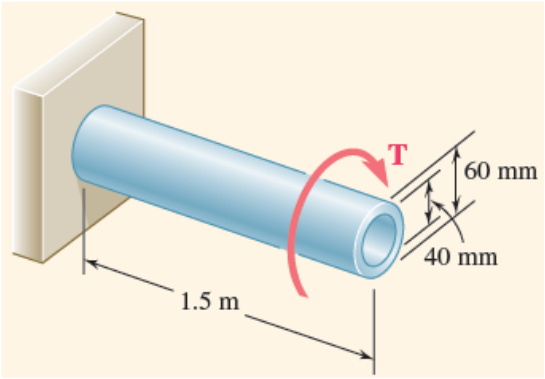
Problem 1 :

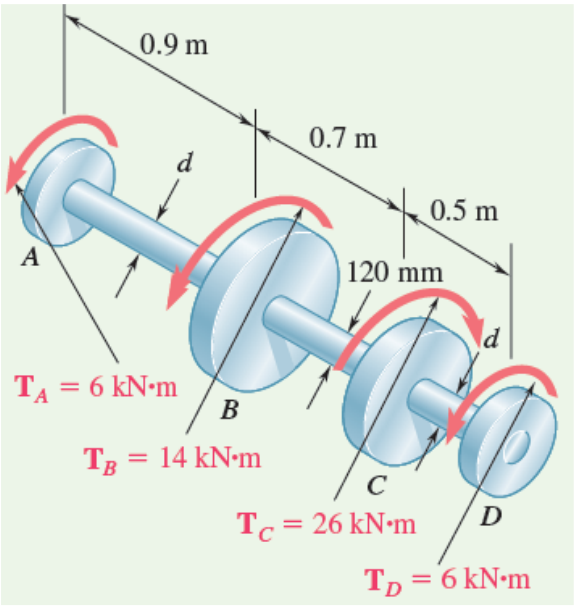
A cylinder is subjected to a torsional torque C = 2.5 kN.m. The Coulomb modulus of the material is 78 GPa. Calculate:
a) the maximum shear stress in the cylinder.
b) the corresponding distortion $(\gamma)_{max}$ in rd.
c) the corresponding angle of rotation ϕ_{max}.



Problem 2 :

A hollow cylindrical shaft 1.5 m long has equal inner and outer diameters of 40 and 60 mm, respectively. (a) What is the maximum torque the shaft can withstand if the shear stress does not exceed 120 MPa? (b) What is the minimum value of the corresponding shear stress in this shaft?



Problem 3 :

Shaft *BC* is hollow with inner and outer diameters of 90 mm and 120 mm, respectively. Shafts *AB* and *CD* are solid and of diameter *d*. For the loading shown, determine :
(*a*) the maximum and minimum shearing stress in shaft *BC*,
(*b*) the required diameter *d* of shafts *AB* and *CD* if the allowable shearing stress in these shafts is 65 MPa.